

Digital Resilience and Technology Adoption Among Retail SMEs in Post-Pandemic Metro Manila

Eriland Ruiz B. Osio^{1*}, Fernando L. Trinidad², Grecebio Jonathan D. Alejandro³

^{1,2,3}The Graduate School, University of Santo Tomas España Boulevard, 1015 Manila, Philippines.

¹ORCID: <https://orcid.org/0009-0000-4713-3618>

²ORCID: <https://orcid.org/0000-0002-3829-5700>

³ORCID: <https://orcid.org/0000-0003-4524-0385>

ABSTRACT:

Background/Introduction: Recently, COVID-19 required the digitization of retail small to medium enterprises (SMEs) globally, as they had to adapt or shut down permanently. During this pandemic, mall-based SMEs in Metro Manila also had to severely adapt to the changes in foot traffic and consumer behavior.

Objectives: This research assessed which elements of organization resources and capabilities impacted the patterns of technological acceptance and which elements affected operational performance of retail SMEs located in the shopping malls of Metro Manila during the transition period of the pandemic.

Materials and Methods: Within a period of 3 months from March- June 2024, 500 retail managers from 6 major shopping malls completed questionnaires that were utilized to collect data. The research utilized an integrated approach which involved; Resource Based View, Technology Acceptance Model and Post-Acceptance Model which sought to examine relationships on the basis of using correlation and hierarchical regression analyses.

Results: Results indicated that 44% of SMEs making use of social media and 38% utilizing cashless payment systems, however, further technology adoption was still minimal. Organizational capabilities ($\beta = 0.40$, $p < 0.01$) demonstrated stronger influence on adoption than financial resources ($\beta = 0.35$, $p < 0.01$). Digital adoption enhanced customer service ($r = 0.46$, $p < 0.01$) and acquisition ($r = 0.38$, $p < 0.01$) but increased operational costs short-term.

Conclusion and Implications: The results present a challenge to the traditional view that financial constraints are the primary barrier to digitalization, given that in a subsidies-free environment, the development of capabilities should take precedence in SME support policies.

Contribution/Originality: This research contradicts the prevailing assumption that financial resources constitute the primary determinant of successful digital transformation in retail SMEs. By demonstrating that organizational capabilities exert greater influence than financial resources on both technology adoption and performance outcomes, this study reframes digitalization discourse toward capability-building rather than capital accumulation.

KEYWORDS: Digital transformation; SME resilience; Technology adoption; Organizational capabilities; Post-pandemic operations.

1. INTRODUCTION

The pandemic disrupted all retail activities globally. Because of the crisis, small and medium enterprises (SMEs) had to make a decision to either digitally transform and survive or go out of business (Juergensen et al., 2020). In the Philippines, SMEs make up 63% of the workforce and account for 35% of the economic GDP. Retail SMEs inside shopping malls experience high volatility since foot traffic on malls went to zero and consumer spending shifted to online (Lobo et al., 2021).

Unlike large cooperation with their ample funding and developed IT structures, small mall retail SMEs had no digital experience, low investment, and their business model relied on walked customers. A capability and resource based study of SMEs reveals digitalization gaps on the international stage. The case of Metro Manila is particularly telling, as the malls in this metropolitan area house numerous retail SMEs servicing the middle and upper middle class customers and in turn, build an ecosystem of fashion boutiques, specialty retail, and personal selling service businesses dependent on their physical stores.

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Research shows that companies with digital competencies experienced minor disruptions and recovered more quickly. Compared to companies with fewer digital resources, digitally-capable SMEs faced less severe repercussions of the pandemic as they integrated digital systems to meet demand, safeguard cash positions, and quickly restart operations (Cong et al., 2024).

Even as the importance of digitalization continues to grow, the digitalization of SMEs in the developing world's economy still receives inadequate attention. The existing body of literature tends to focus on either developed nations, or technology adoption without appreciating the relationship between organizational ability and the scarcity of resources. Very few studies have systematically explored how mall-based retail SMEs develop new pandemic-induced capabilities while managing these constraints.

The Philippines isn't the only country where the urgency of SME digitalization is a regional necessity across Southeast Asian economies. According to Malaysia where 63.9% of SMEs digitalized during the COVID-19 pandemic, and Indonesia, where resource constraints similarly impeded transformation progress, suggests shared challenges despite varying national contexts. The OECD (2024) points out that Asian SMEs lack of digitalized technologies and infrastructural support, as well as a scarcity of human resources and institutional frameworks. All of which are more evident in underdeveloped countries. Thus, the Metro Manila retail SMEs' digitalization journey is of great value to ASEAN policymakers wanting to enhance the regional economic resilience to diverse shocks. Also, as the Philippines is aspiring to be the digital economy leader in Southeast Asia, studying retail SMEs in malls is instrumental in proving the need to create support policies that go beyond pure financial assistance to address the capability constraints.

This study examines the following questions: (1) What digital technologies have retail SMEs adopted, and what factors explain these adoption patterns? (2) How do organizational resources and capabilities influence technology adoption and the value created in daily operations? (3) Why do operational challenges persist in the post-pandemic period despite efforts to digitalize? This study proposes a novel approach to the digital crisis and to the long term strategy for developing capabilities through the integration of the Resource Based View, Technology Acceptance Model, and Post-Acceptance Model suggesting digital transformation as a tactical move to addressing and mitigating the crisis.

2. LITERATURE REVIEW

2.1 Digital Transformation in Retail SMEs

Digital transformation changes how businesses operate due to specific technology deployment (Verhoef et al., 2021). For retail SMEs, the pace of technological advancement accelerated marker from 2020. Research reported 1,566 publications from 2001 to 2024, notable increases concentrated in 2022 (Sustainability, 2024), attesting to remarkable interest in the ways small businesses sustain competitive advantage in the digital transformation phase.

Retail SMEs consider digital channels as integral to business model, enhancing strategic online engagements, contactless payment, and remote business (Briedis et al., 2020). In 2020, 63.9% of Malaysian SMEs reported online sales resulted in a revenue growth of 10%. With 40.4% initiating online sales due to pandemic disruptions (Lumat, 2023). Similar situation was reported in India where retail SMEs were unable to efficiently digitize their operations (Pal & Gupta, 2021).

Technological advancements range from basic social media networking sites to sophisticated systems such as customer relationship management (CRM), cloud-based inventory management systems, and advanced analytical software. More sophisticated systems are, however, more expensive and, as noted with many retail SMEs, the needed technical know-how and organizational capacity to effectively utilize such systems is often lacking (Yap & Soh, 2021). Therefore, the digital divide goes well beyond mere adoption rates to the sophistication of technologies being utilized.

Research on smart manufacturing shows technical sophistication stops all but the most advanced SMEs in resource base levels from sustaining advanced digital systems (Ghobakhloo & Ching, 2019). Digital skill development gaps in computer security, and government support have been studied (OECD, 2024). However, there are benefits in the digital technology adoption for SMEs in their operational efficiency, market access, and innovation that are garnished in competitiveness (Chen & Biswas, 2021).

The patterns in adoption do not explain the variances in the SMEs in the success of transformation. Organizational structures that enable or inhibit successful digitization for transformation and success are essential.

Overall, the literature on digital transformation indicates that retail SMEs encounter a paradox. On one hand, social media and payment apps are highly used because of their low entry obstacles, whereas on the on the other hand, and barring the obstacles, there are also other transforming technologies that require a high degree of resources which are generally unavailable; and are thus, not used. The patterns of adoption in themselves, tell only part of the story---the organizational structures and the capabilities that allow for successful implementations determine whether a firm gets a competitive edge from its technology investments. This difference between the breadth of adoption and the depth of implementation, along with the resources and capabilities, assists in determining the transformation. This is the motivation for our study.

2.2 Organizational Resources and Capabilities

The Resource-Based Theory explains that among different models, the optimal way explaining the factors that lead to competitive advantage is the having the appropriate resources and capabilities which are valuable, rare, inimitable and non-substitutable (Barney, 1991). With regards to the operational features of retail SMEs, resource scarcity is a significant operational feature. Unlike large companies, small firms function with minimal financial buffers, small employee bases and low capacity to invest creating a troubling paradox: firms that most need to undergo a digital transformation are the ones that are likely to face the most challenges in achieving it.

Resources that are not financial in nature may be even more critical in achieving positive transformation than previously assumed. Within the Technology-Organization-Environment (TOE) framework, studies indicate that digital culture, support of top management, and the human resource capabilities often overshadow technology costs in importance (Sharma et al., 2024). This is contrary to the prevalent notion that lack of finances is the predominant barrier to SMEs. Micro foundational research perspectives identify individual capabilities and entrepreneurial cognition as the most critical in realizing outcomes of transformation at the organizational level (Scuotto et al., 2021).

Retail SMEs possess distinct capability dimensions including IT infrastructure quality, employee digital skill levels, and successful technology implementation history. Technology-capable firms usually adopt new systems more easily and gain more from digital investments. Research suggests SME owners with advanced digital skills tend toward more proactive resource approaches and problem-solving lifecycles (Li et al., 2022).

Organizational tenure, branch network extent, and accumulated market experience comprise operational capability. Though older firms have more sophisticated systems and operational memory, age can also create an organizational stagnation that resists positive change. Adaptive capability is defined as an organization's willingness and ability to change its operational approach in response to its surroundings, especially during significant operational changes (Hartono et al., 2024). Network ability is in reference to an organization's relationships with critical stakeholders; suppliers, customers, and firms in their industry. In digitally based networks, firms experience significant pressure to adopt new technologies while also being able to access valuable information.

Studies have started to consider more complex intersections within dimensions of capability. In the Indonesian setting, Hartono et al. (2024) integrated Resource Based View and Dynamic Capability View theory, exemplifying how the adoption of technology serves as a 'quasi-moderator'— being formed by certain capabilities and, in turn, forming how these capabilities influence organizational performance. In the case of SMEs, the theory of dynamic capabilities, ability to incorporate and reconfigure competencies within organizations, is particularly useful in assessing how firms respond to a crisis (Teece, 2007).

In relation to technology adoption, both the ability to obtain resources and the organizational competencies it generates become a dual dynamic relationship. A recursive dynamic of such a relationship shows that the adoption of technology is more than just a reaction to existing market conditions. Instead, it is a resource-process constructing of organizational capabilities that builds a sustained competitive advantage.

Combining the perspectives of resources and capabilities reveals that avoiding resources is not enough for a productive digital transformation. One also needs to build a dynamic competence that allows for the efficient orchestration of resources. This differentiation is particularly important for retail SMEs: Unlike large players that can afford to over-resource and under-capable, resource-constrained SMEs should focus on developing competencies as the predominant route to digital competitiveness. This line of reasoning informs the formulation of the capabilities, and not resources, hypothesis as the main predictor of both adoption and performance in the post-pandemic retail sector.

2.3 Technology Adoption Theories

Understanding modern technology adoption models require consideration of foundational explanations for both initial adoption and ongoing implementation efforts. This study uses three interconnected frameworks: Technology Acceptance Model (TAM), Post-Acceptance Model (PAM), and Resource-Based View (RBV).

As described by Davis (1989), TAM explains technology adoption as being correlated to two perceptions: perceived ease of use and perceived usefulness. Beliefs that the technology can streamline job tasks is what perceived usefulness represents, and perceived ease of use speaks to the workflows and tasks not being complicated as well as the technology being easy to use. While the TAM theory continues to be the benchmark across disciplines, explaining the use of technology within an organization requires a consideration of more than just individual assessmentss. This has led to the development of variations of TAM to explain these differences including social influence, changes within a system, and due to motivational emotions (Venkatesh et al., 2012).

Individual perceived value, particularly with respect to resource-constrained SMEs, translates directly to anticipated value in customer satisfaction, reduced costs, and increased profits. The resources SMEs employ to overcome implementation barriers are

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larger given the perceived value; however, implementation challenging technologies are rejected regardless of the perceived value. SMEs cannot afford to lose resources overcoming high implementation hurdles.

With the PAM, Bhattacharjee (2001) extended adoption research beyond the first implementation phase, focusing on the value derived from the use of the technology over time rather than the use of the technology. The value in the use of technology is especially important in the case of SMEs in retail that are swiftly adopting technologies to meet the challenges of the pandemic. These SMEs require strategies for sustaining the use of the technologies post adoption, especially when there is a downturn in enthusiasm, or when the anticipated benefits do not materialize (Zutshi et al., 2021). Within the PAM, successful innovation is built on ongoing supportive organizational structures that facilitate the integration of technology into the routine operations of the organization.

The principles of the RBV, TAP, and PAM collectively provide synergy and concord of TAM- system and technology characteristics, RBV- organizational characteristics, and PAM- persistent adoption patterns. Emerging works of the node are situating the RBV, PAM, and TAM works to the broader TOE- oriented adoption frameworks arguing the adoption stems from the interactivity of the TOE components (Tornatzky & Fleischer, 1990). TOE approaches show empirical validation, organizational dimensions, and contextual characteristics of the organizational work show to be the predominate drivers of the outcome of the primary level adoption (Badghish & Soomro, 2024). Within enterprise system adoption streams, organizational context and surrounding environment represent most critical successful and unsuccessful systems implementation determinants (Ramdani et al., 2022).

Collectively, these three theoretical frameworks provide complementary lenses for understanding digital transformation as a multifaceted process. TAM explains initial adoption decisions through perceived technology attributes; PAM extends analysis to sustained usage patterns based on satisfaction and value realization; RBV contextualizes both adoption and continuance within organizational resource and capability constraints. This integrated theoretical approach enables us to examine not only whether SMEs adopt technologies, but why they adopt specific technologies, how they sustain usage over time, and what organizational characteristics predict successful implementation outcomes. By synthesizing individual perceptions (TAM), usage patterns (PAM), and organizational context (RBV), we construct a comprehensive framework for analyzing digital transformation dynamics in resource-constrained retail settings.

2.4 Theoretical Framework and Hypotheses

The literature indicates misconceptions relating to how an organization's resources and capabilities interact in adoption decisions and subsequent performance outcomes. In an attempt to address these misconceptions, we have developed an integrative model using RBV, TAM, and PAM. Our model conceptualizes the organization's resources and capabilities as the primary antecedents to digital adoption during and post-pandemic periods, while adoption subsequently impacts numerous operational performance outcomes (see Figure 1).

We believe resources and capabilities may function in the absence of technology enabling roles and have direct performance impacts showing multiple influence pathways. This blended dual mechanism, direct impact and adoption-mediated impact, helps to clarify the intricate relationships ecosystems within an organization and the competitive outcomes.

Utilizing this integrated theoretical framework, we aim to present and to validate the following hypotheses.

H1: Organizational resources positively influence digital technology adoption among retail SMEs.

H2: Organizational capabilities positively influence digital technology adoption among retail SMEs.

H3a-e: Digital adoption positively influences (a) general business situation, (b) operational cost reduction, (c) customer service quality, (d) customer traffic, and (e) customer acquisition.

H4: Organizational resources positively influence post-COVID operational performance.

H5: Organizational capabilities positively influence post-COVID operational performance.

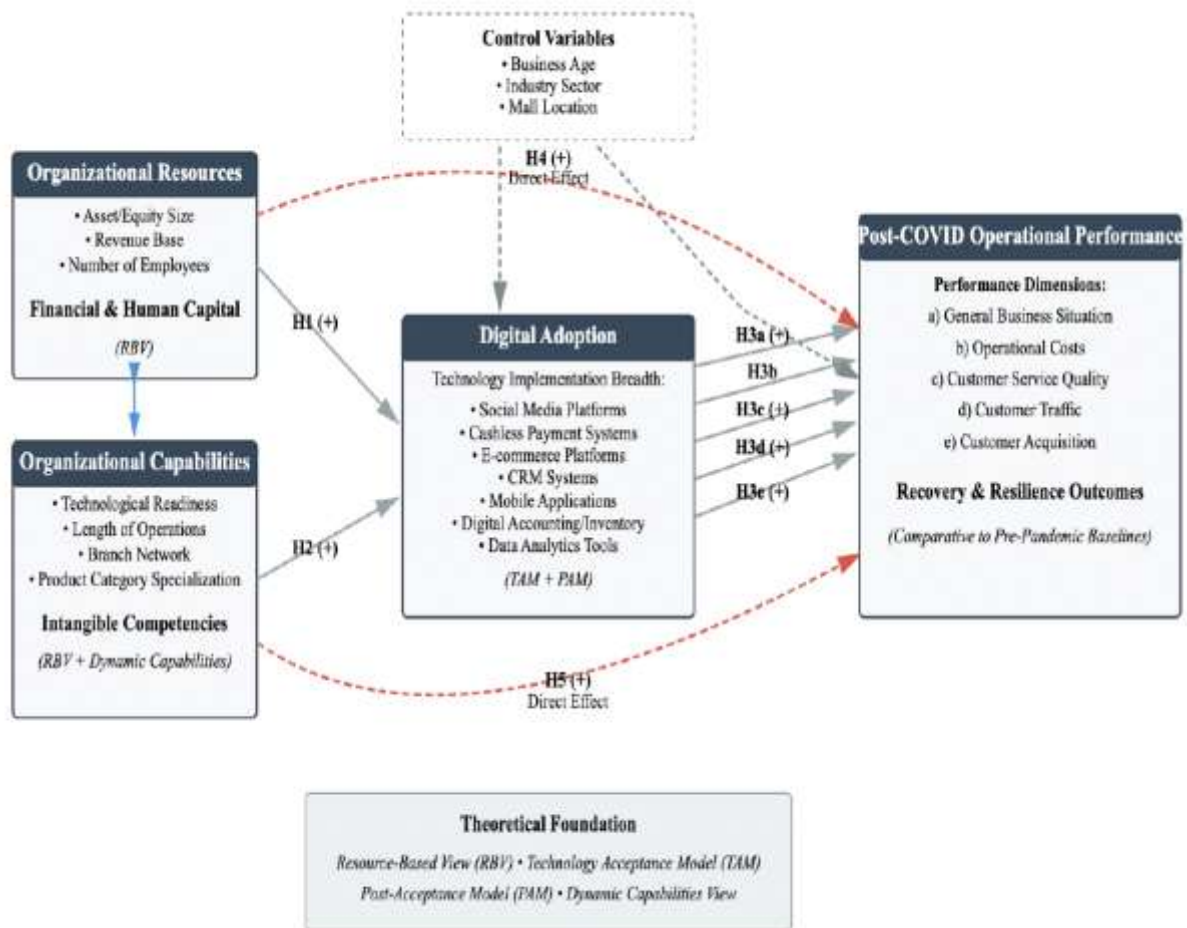


Figure 1. Conceptual Framework: Digital Transformation and Post-COVID Performance Among Retail SM

3. RESEARCH METHODOLOGY

3.1 Research Design and Sampling

A cross-sectional quantitative design involving descriptive and correlation analyses was used in this investigation. There was a data collection period from March-June 2024 which corresponded with the transition of the Philippines from a pandemic emergency situation to an endemic situation. This period was the consolidation period after the first crisis framework was put into place. This period was the first time a sustained digital transformation could be measured rather than sustained reactive and temporary adjustments.

We narrowed the investigation to retail small and medium enterprises within six shopping malls in Metro Manila which are Trinoma, Glorietta, Greenbelt, Market Market, Cloverleaf, and Feliz. These areas cover different parts and have different consumer demographics in the Metro Manila region, providing a complete overview of the retail SME situation. A minimum of 384 respondents was determined from Cochran's formula for sample size estimation, the 500 managers surveyed exceeded this minimum by 30%, this was done to increase the statistical power and to compensate for possible data quality issues. This sample size provides adequate power with 0.80 for detecting medium effect sizes ($f^2=0.15$), and for 0.05 alpha levels in multiple regression analysis with 10 predictor variables.

The criteria for participation included: (1) their classification as SME as per Department of Trade and Industry, (2) their operation being in retail trade, (3) their position as a manager or owner-manager who is a decision-maker, and (4) the use of at least one form of digital technology during or after the pandemic.

3.2 Research Instrument and Data Collection

A self-administered questionnaire divided into 4 sections was prepared and moderated by industry professionals: (1) Governance Senior Manager and Certified Management Consultant (CMC), (2) Metrobank Department Head Test Engineer, (3) and Regional Manager in Charge of Business Analytics. Their feedback ensured that the questionnaire items were clear, relevant, and aligned with the study's objectives.

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Section 1 gathered organizational profile information, including business classification, revenue bracket, number of employees, years in operation, and branch network size.

Section 2 measured technology adoption through an eight-item checklist capturing the use of social media, cashless payment systems, e-commerce platforms, CRM tools, mobile applications, digital accounting tools, digital inventory systems, and analytics solutions.

Section 3 assessed post-pandemic operational performance using five-point Likert scales (1 = significantly worse than pre-pandemic; 5 = significantly better). The indicators included overall business situation, operational costs, customer service quality, customer traffic, and customer acquisition levels.

Section 4 allowed respondents to describe their implementation experiences and identify barriers that constrained the digital transformation process.

The pilot test endorsed by 50 respondents indicated good test reliability (overall Cronbach's $\alpha = 0.86$; range of subscales = 0.79-0.91). The comments from the respondents of the pilot test helped the researcher clarify which questions needed modification and helped in shortening the length of the questionnaire so that the respondents would experience little survey fatigue. Research assistants employed electronic format questionnaires (QR code via Google Forms) and paper-based questionnaires with QR codes administered in-person. During busy mall periods, assistants provided research information, obtained informed consent, and assisted when required, helping resolve different technological ease-of-use levels across retail environments.

Informed consent was carefully obtained with study procedures explained, ensuring data confidentiality and participant anonymity. The compliance rate was 73%, resulting in 500+ completed questionnaires during four-month data collection. Analysis of first and last month respondents showed balanced demographic characteristics, indicating samples were not biased relative to explanatory questions.

3.3 Measurement and Variables

Organizational resources: Operationalized using two key proxies: annual revenue (four categories) and employee count (five categories). Though focusing only on financial and human resources proves non-exhaustive, these highlight most significant resource constraints for retail SMEs. Both proxies were standardized then averaged forming summary resource scores for analysis.

Organizational capabilities: Number of digital tools already deployed measured technological capability. Operational capability was determined by business tenure and branch network size, serving as accumulated operational experience indicators. Adaptive capability was assessed by self-reported willingness to change operational areas reacting to shifting circumstances. These capability indicators were standardized and averaged forming summary capability scores.

Digital adoption: Breadth of adoption measured as total technologies embraced from an eight-item list (range: 1-8). This approach considers technology variety adopted, though not addressing adoption depth and quality—a limitation addressed in discussion.

Operational Performance: Five performance dimensions were evaluated using single-item scales comparing post-pandemic to pre-pandemic baseline performance levels. Though multiple-item scales offer psychometric benefits, practical survey implementation limitations warranted this simplified option. Prior studies show single-item performance measures prove reliable when constructs are concrete and unidimensional.

3.4 Data Analysis

All analyses were conducted using SPSS 28 and SmartPLS 3. Summary statistics (means, frequencies, standard deviations) defined sample composition. Pearson correlation coefficients analyzed bivariate associations of critical study variables. We evaluated the proposed model using hierarchical multiple regression analysis structured as two distinct phases.

Phase one tested organizational resources and capabilities regression on digital adoption breadth (H1 and H2). Phase two tested resources, capabilities, and digital adoption regression on each of five performance dimensions (H3a-e, H4, H5) while controlling organizational age, industry, and mall location tier as cross-sectional variables. We checked variance inflation factors (VIFs) for potential multicollinearity issues; all VIF values were well below 2.0, thus multicollinearity should have little influence on regression estimates. Statistical significance was evaluated using conventional thresholds ($p < 0.05$, $p < 0.01$, $p < 0.001$).

4. RESULTS

4.1 Sample Characteristics

Table 1 shows demographic and organizational characteristics of 500 retail SME respondents. Our sample consists of 49% retail non-food outlets, 36.6% retail service firms, and 14.4% food and drink businesses. Of these, 78.2% claimed annual revenue below five million pesos, and 67% had under 50 employees, typical of Philippine economy dominated by micro and small businesses.

Significant imbalance existed in operational tenure across our sample. Individuals and businesses operating for only 1-3 years comprises 34.8% of the total. They probably just opened during or a little before the pandemic. About 60% of them are single unit

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operations and 40.4% are multi-unit operations. In terms of technological capability, the distribution was normally distributed, 43.2% showed moderate digital capability (3 technologies adopted), 31.8% showed low digital capability (1-2 technologies), and 25% showed high (4-5 technologies).

Table 1. Demographic and organizational characteristics (N=500)

Characteristic	Category	n	%
Business Type	Retail Non-Food	245	49.0
	Retail Services	183	36.6
	Retail Manufacturing	47	9.4
	Others	25	5.0
Revenue & Employees	<PHP1M & <10 employees	189	37.8
	PHP1-5M & 10-50 employees	202	40.4
	PHP5-10M & 50-100 employees	92	18.4
	>PHP10M & >100 employees	17	3.4
Years in Mall	<1 year	68	13.6
	1-3 years	174	34.8
	3-5 years	123	24.6
	>5 years	135	27.0
Branch Network	Single location	298	59.6
	Multiple branches	202	40.4
Tech Capability	Low (1-2 tools)	98	19.6
	Moderate (3 tools)	216	43.2
	High (4-5 tools)	186	37.2

Note: PHP = Philippine Peso; Tech Capability based on number of digital tools currently in use

4.2 Digital Technology Adoption Patterns

Small enterprises had the most significant adoption of the social media platforms at 44% adoption due to the low costs and high availability of volume. 38% adoption of digital cashless payment systems during the social media streamlining of services of the pandemic era followed closely. Adoption of e-commerce platforms was 33.6% (Figure 2).

The digital technology adoption of all other technological advances was considerably lower. For systems of customer relationship management, the digital technology adoption was 24%. For mobile applications, the adoption was 19.6%, for digital accounting systems, it was 17.2%, for systems of inventory management, it was 15.8%, and for digital data analytics, it was 14%. The trends are evident of a common higher integration of sophisticated communication and transaction tools but a lower use of sophisticated management and analytics tools.

On average, respondents had adopted 2.3 different digital technologies (SD = 1.4), indicating that the majority of the sample SMEs had only adopted a fairly rudimentary digital technology and, therefore, had not achieved any significant transformations to their operational process.

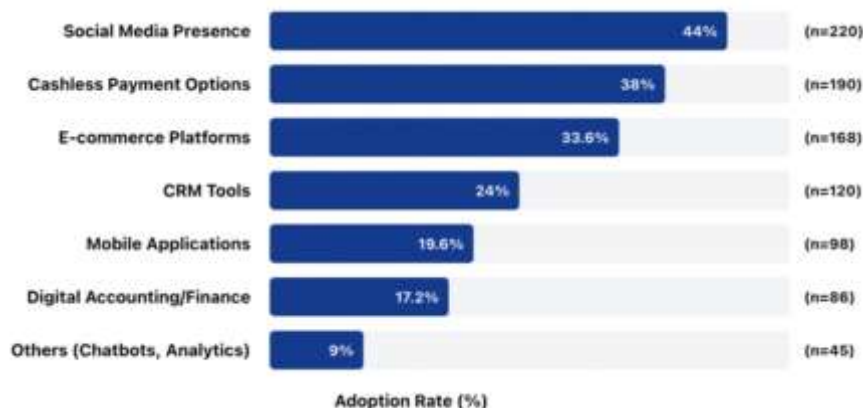


Figure 2. Digital technology adoption rates (N=500)

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4.3 Post-COVID Operational Performance

Figure 3 summarizes the post-pandemic performance of retail SMEs across five operational dimensions, using a five-point scale comparing conditions before and after the pandemic. Among the indicators, **customer service quality** received the highest mean score ($M = 3.45$, $SD = 0.70$), suggesting that digital tools such as messaging platforms, online ordering features, and automated responses helped firms improve service delivery and responsiveness.

The **general business situation** also showed moderate improvement ($M = 3.25$, $SD = 0.80$), indicating that many SMEs experienced a gradual recovery as restrictions eased and digital channels became more integrated into their operations. Scores for **customer acquisition** were slightly lower ($M = 3.10$, $SD = 0.90$), reflecting that while digital tools helped broaden reach, converting new customers remained a challenge for many firms.

In contrast, **operational costs** received a below-neutral assessment ($M = 2.90$, $SD = 0.75$). This indicates that expenses tended to rise rather than decline after adopting new technologies. Higher operating costs likely stemmed from investments in digital infrastructure, recurring subscription fees, training requirements, and the temporary need to maintain both traditional and digital systems during the transition period.

Customer traffic posted the lowest rating ($M = 2.80$, $SD = 0.85$). Despite digital adoption efforts, foot traffic in malls remained consistently below pre-pandemic levels, highlighting ongoing structural challenges that digital tools alone could not fully offset.

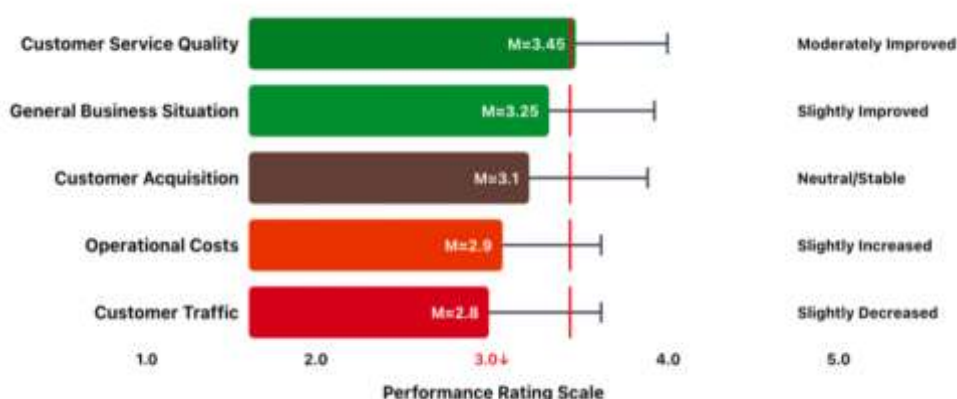


Figure 3. Post-COVID operational performance dimensions

4.4 Relationships Between Variables

Table 2 indicated correlations of primary study variables. Financial and human resources associated positively with operational and technological capabilities ($r = 0.52$, $p < 0.01$). Both resources ($r = 0.41$, $p < 0.01$) and capabilities ($r = 0.48$, $p < 0.01$) associated positively with digital technology adoption breadth, lending preliminary support to H1 and H2, respectively. Interestingly, capabilities showed stronger relationships with adoption than resources.

Digital adoption showed strong positive relationships with four of five performance dimensions: general business situation ($r = 0.35$, $p < 0.01$), customer service quality ($r = 0.46$, $p < 0.01$), customer traffic ($r = 0.31$, $p < 0.01$), and customer acquisition ($r = 0.38$, $p < 0.01$). Contrarily, adoption showed inverse relationships with operational costs ($r = -0.28$, $p < 0.01$), suggesting operational technology associated with higher operational costs.

Organizational resources and capabilities positively correlated with most performance measures, suggesting these organizational characteristics affect business performance through both technology-based and direct pathways.

Table 2. Pearson Correlation Matrix Among Key Variables

Variables	1	2	3	4	5	6	7	8
1. Resources	—							
2. Capabilities	.52**	—						
3. Digital Adoption	.41**	.48**	—					
4. General Situation	.29**	.34**	.42**	—				
5. Operational Costs	-.21**	-.25**	-.28**	-.15*	—			
6. Customer Service	.25**	.38**	.46**	.61**	-.18**	—		
7. Customer Traffic	.23**	.32**	.30*	.54**	-.12*	.48**	—	

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Variables	1	2	3	4	5	6	7	8
8. Customer Acquisition	.31**	.37**	.38**	.58**	-.14*	.52**	.61**	—

Note: ** $p < .01$; * $p < .05$ (two-tailed); $N=500$

4.5 Predictors of Adoption and Performance

Table 3 shows regression model results estimating digital adoption based on organizational resources and capabilities. Both resources significantly predicted adoption ($\beta = 0.35$, $p < 0.001$), supporting H1 and confirming technology implementation facilitation through financial and human resource availability. Organizational capabilities effects were even stronger ($\beta = 0.40$, $p < 0.001$), supporting H2 and showing organizational capabilities are at least as important—if not more important than—financing in adopting technologies.

Digital adoption showed considerable explained variance across model predictors ($R^2 = 0.35$, Adj. $R^2 = 0.34$, $F = 53.2$, $p < 0.001$). VIF values were under 2.0, which confirms that multicollinearity is not an issue. The control variables mostly have no effect, meaning adoption tendencies are fairly consistent across different ages of the business, different industries, and different mall locations.

Table 3. Multiple Regression Analysis Predicting Digital Adoption from Resources and Capabilities

Predictor	β	SE	t	p	VIF
Resources	.35	.08	4.38	<.001	1.38
Capabilities	.40	.07	5.71	<.001	1.38
<i>Control Variables</i>					
Business Age	.12	.06	2.00	.046	1.15
Industry Sector	.08	.05	1.60	.110	1.08
Mall Location	.05	.04	1.25	.212	1.06
Model Statistics	$R^2 = .35$	Adj. $R^2 = .34$	$F(5,494) = 53.2^{***}$		

Note: *** $p < .001$; $N = 500$; β = standardized regression coefficient; SE = standard error; VIF = variance inflation factor

Table 4 presents five separate regression models predicting each performance dimension. For general business situation, resources ($\beta = 0.22$, $p < 0.001$), capabilities ($\beta = 0.28$, $p < 0.001$), and digital adoption ($\beta = 0.25$, $p < 0.001$) all showed significant positive effects, supporting H3a, H4, and H5. These results indicate improved business situations result from adequate resource combinations, strong organizational capabilities, and successful technology implementation.

The operational costs model revealed unexpected findings. Resources ($\beta = -0.18$, $p < 0.01$), capabilities ($\beta = -0.21$, $p < 0.01$), and digital adoption ($\beta = -0.24$, $p < 0.001$) all demonstrated negative coefficients. Unlike H3b, the adoption of technology incurred costs increases rather than decreases, probably due to costly digital transformation activity interruptions, alongside the expenses of software, hardware, employee training, and system maintenance. Negative coefficients for resources and capabilities imply larger and more sophisticated companies having made even greater investments in the digital transformation and thus having incurred increased costs.

Customer service quality showed strong positive effects from digital adoption ($\beta = 0.32$, $p < 0.001$) and capabilities ($\beta = 0.35$, $p < 0.001$), with resources contributing more modestly ($\beta = 0.19$, $p < 0.01$). These findings strongly support H3c, H4, and H5, emphasizing service improvements derive primarily from actual technology use and strong organizational capabilities rather than resource availability alone.

Customer traffic benefited significantly from resources ($\beta = 0.21$, $p < 0.01$), capabilities ($\beta = 0.26$, $p < 0.001$), and digital adoption ($\beta = 0.28$, $p < 0.001$), supporting H3d, H4, and H5. Similarly, customer acquisition showed positive effects from resources ($\beta = 0.23$, $p < 0.01$), capabilities ($\beta = 0.30$, $p < 0.001$), and digital adoption ($\beta = 0.26$, $p < 0.001$), supporting H3e, H4, and H5.

Across all performance models, capability coefficients generally equaled or exceeded resource coefficients, reinforcing our central finding that organizational capabilities influence post-pandemic performance more significantly than resources alone.

Table 4. Multiple Regression Analyses Predicting Post-COVID Performance Dimensions

Predictors	General Situation	Operational Costs	Customer Service	Customer Traffic	Customer Acquisition
	β (p)	β (p)	β (p)	β (p)	β (p)

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Predictors	General Situation	Operational Costs	Customer Service	Customer Traffic	Customer Acquisition
Resources	.25 (<.001)	-.18 (.004)	.21 (.001)	.19 (.003)	.27 (<.001)
Capabilities	.28 (<.001)	-.22 (.001)	.35 (<.001)	.30 (<.001)	.33 (<.001)
Digital Adoption	.28 (<.001)	-.15 (.021)	.31 (<.001)	.18 (.009)	.24 (.001)
Model Statistics					
R ²	.30	.20	.32	.28	.34
Adjusted R ²	.29	.19	.31	.27	.33
F-statistic	29.7***	17.4***	32.5***	27.0***	35.8***

Note: *** $p < .001$; $N = 500$; β = standardized regression coefficient; Control variables (business age, industry sector, mall location) included but not shown for parsimony

4.6 Benefits and Challenges

Adopted technology perks regarded by sample adopters are illustrated in Figure 4. 72.5% regarded "Improved operational efficiency" as attributable operational value from beneficial purchase order fulfillment, transaction automation, and better inventory management. "Expanded market reach" came second at 60% as many businesses extended customer bases beyond physical store location confines. "Increased customer engagement" at 47.5%, "Improved data insights" at 40%, and "Higher sales" at 35% clearly demonstrated multifaceted ways digital technology and retail SMEs intertwined value.

Respondents reported main implementation challenges shown in Figure 5. High adoption costs emerged as first concern for 60%, aligning with other negative correlations seen with operational costs and technology adoption. Lack of technical skills was second at 45%, indicating real ability gaps within such organizations. Other challenges rounding top five were infrastructure gaps (37.5%), limited customer digital adoption (32.5%), and time scarcity (28%). Results point to critical findings that money alone doesn't ensure transformation success.

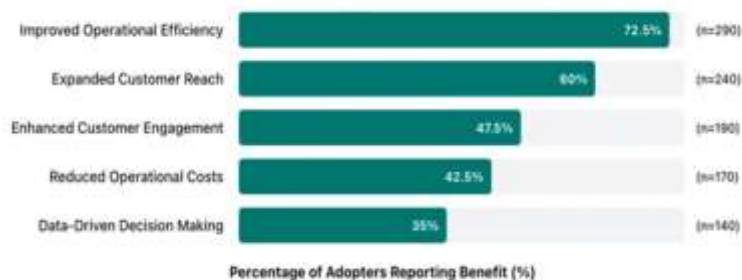


Figure 4. Reported digital technology benefits (n=400)

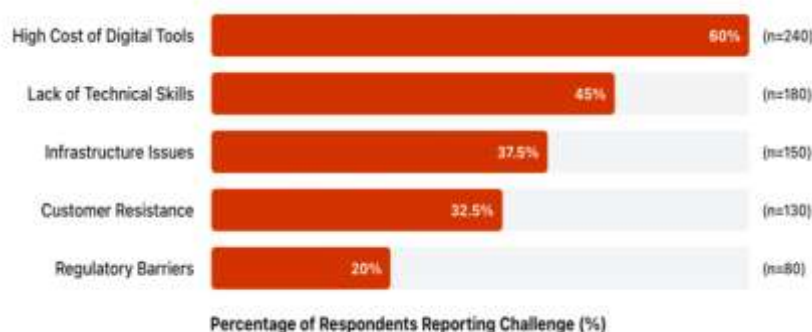


Figure 5. Primary implementation barriers (N=500)

5. DISCUSSION

5.1 Theoretical Contributions

This study makes several key theoretical contributions exploring digital transformation contexts in retail SMEs. First, we illustrate that technology adoption and operational performance in post-pandemic periods depend more heavily on organizational capabilities relative to financial resources. Across all analyses, capability coefficients constantly equaled or surpassed resource coefficients, with many capability-outcome relationships proving considerably stronger. This supports Resource Based View in that competitive advantage in ever-changing environments relates more to organizational capabilities than resources.

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Conventional wisdom placing financial barriers as primary SME digitalization barriers appears outdated. Our evidence suggests lack of capabilities represents more constraining digital transformation factors. As such, SME-targeted policy instruments focusing on financial subsidies prove overly simplistic. Investments in capability development including targeted training programs, infrastructure advancement, and knowledge transfer likely benefit firms and economies overall.

Second, we demonstrate integrated TAM, PAM, and RBV framework value as multi-level theoretical studies. Addressing individual-level perceptions, sustained usage, and organizational features together provides richer digital transformation process understanding than any individual theory.

Third, we enhance transformation outcome understanding in critical aspects. Our finding that technology adoption positively impacts customer-facing performance metrics while raising operational expenditures simultaneously challenges simplistic digitalization benefit storytelling. On the contrary, it reveals even more intricate dynamics where purposeful short-term cost spending is rather an investment for long-term competitive benefits. European SMEs also documented similar J-curve effects in their studies: the first entry stage shows an inflow of new investments that are associated with cost outflows due to the preceding investment spending along with a productivity outgain which increases a positive bottom line (Pfister & Lehmann, 2023). The value lag in time has info-structural implications for SMEs with little resources that are attempting to penetrate the market in a monopolistic scenario.

Finally, as for the organizational resilience literature we have jointly published on, JTC also treats digital transformation in the face of a crisis as an immediate crisis response, but also as a highly protracted sequence of events that builds new organizational capabilities. No other case of transformation relies as much on collection of resources in a purposeful, strategic manner, rather than on tactical and operational re-positioning that avoids disruption. The capabilities as well as the adoption cycles that are present suggest that the focal area to be targeted in a case of transformation should be the creation of new organizational capabilities as a result of a high degree of digital adoption.

5.2 Practical Implications

Our findings suggest implications for various stakeholder groups concerned with pandemic recovery and continuing digital evolution.

In the case of the managers of SMEs, the suggestion provided is to create new technology— new capability adaptations are learned, and much more is needed. The best strategies involve the use of three to four congruent digital tools instead of very little utilization or, in the case of low organizational readiness, trying a full digital transformation. Expectations that managers have of the digital transformation should be modified. The primary reason organizational digital investments are made should be the anticipated improvement in revenue and customer service, rather than a hope to achieve cost savings. Savings are often results and benefits that come from technologies having been integrated into seamless, day-to-day workflows that have economized the costs of initial investments made to implement new technologies.

Mall owners can promote integrated digital infrastructure, tiered training, and collaborative advertising initiatives in exchange for tenants' participation in enhanced digitized ecosystems. When shopping center owners empower tenants to advance digital retailing, it benefits all businesses and shopping center destinations. To equip owners with digital resource centers, the establishment of peer learning networks, and the construction of collective licensing frameworks, each tenant's acquisition costs can be lowered while the digital capabilities of the entire ecosystem are enhanced.

Policymakers should understand that targeted support for digital transformation encompasses much more than fiscal support. Integrated policies that combine financial subsidizations with supportive capabilities and supplementary infrastructure tend to perform more effectively than siloed initiatives (Fernández-Cerezo et al., 2022). Skill development programs that include managers alongside employees of the SMEs are more likely to overcome the technical barriers than the provision of fiscal support subsidizations. To build the ecosystem conditions necessary for the digital transformation of SMEs, reliable Internet connectivity, responsive regulations that promote innovation without excessive compliance constraints, the implementation of infrastructure investments, and peer learning networks to facilitate knowledge exchange all create forums that support ecosystem innovation.

5.3 Limitations and Future Research

Important research limitations could open new research avenues. First, cross-sectional study design applies limitations to causal claims. While theoretical frameworks offer specific causal mechanisms, our data builds on single-period relationships. Causal conclusions are far stronger in longitudinal research designs following firms through multiple measurement periods, revealing how resource, capability, adoption, and performance relationships shift as technology and organizational ability advance.

Sample limitations, in this case only Ayala malls in Metro Manila area, could restrict conclusion scope. These class A shopping malls are mostly frequented by middle and lower-middle class clientele, meaning tenant demographics quite differ from SMEs in

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standalone shops, traditional public markets, or rural areas. Future research involving SMEs in different retail types, various regions, and differing customer demographics is necessary assessing finding relevance in diverse contexts.

Third, self-reported data use creates common method bias concerns. Although self-reported perceptual data accompanied objective performance data from business records aids findings, we took several procedural steps including response anonymity and temporal anchoring. Furthermore, potential single-source bias could be mitigated acquiring data from multiple informants within each organization.

Study only addressed organizational adoption breadth for several technologies rather than depth or implementation quality. Two organizations may both adopt CRM systems, however one may minimally interface while another has full system integration at each customer contact point. These varying implementation levels, user competence, and organizational integration distinguishing effective technology use from mere adoption could be better understood through accompanying qualitative case study research.

Finally, cross-sector analysis remains important future research opportunities. Our analysis aggregated all data across different retail sectors, potentially concealing important adoption, capability, and performance differences across retail subsectors like fashion, electronics, food service, and specialty.

We examined only firms successfully adopting at least one technology, ignoring abandoned implementations or technology use discontinuation cases. Understanding why some firms decide postponing or abandoning adopted technologies can increase long-term transformation initiative viability by understanding supportive and counteracting sustained usage factors.

Data collection periods proved too static for emerging technologies like artificial intelligence, augmented reality, and blockchain, which potentially dramatically change retail SME operations future. Research is needed on these emerging technology uses, requisite capabilities for their use, and resulting performance outcomes as they become more widespread and accessible to smaller firms.

6. CONCLUSION

This study focused on digital technology use and impacts by retail SMEs located in Metro Manila shopping malls and their digital technology use in post-pandemic economy. Based on survey data from 500 retail managers, we evaluated amalgamated theoretical frameworks of Resource Based View and Technology Acceptance and Post-Acceptance frameworks, focusing on how organizational resources and capabilities influence both adoption decisions and agile workflows following post-operational outcomes.

Several findings are exceptionally important. First, among retail SMEs there lacks complete digital transformation. Sample firms averaged only 2.3 basic technology adoptions while more sophisticated technologies were greatly underused. This describes two-tiered digital marketplaces describing disparities among businesses located in rural and urban areas with basic communication and transaction tools while advanced analytical and management systems are second to none.

Second, relative to financial resources, organizational capabilities were more powerful in both operational and technology performance. This illustrates more widely held views that only social, economic, and technological resources exist and their lack is only digitalization barriers, which proves incorrect. Arguments that financial resource lack doesn't weaken premises that transformation success is restricted by capability absence. Explanations why financial resources are less important is businesses' failure investing in more than just reducing digitalization funding policies.

Third, observed performance paradoxes are interesting, particularly how they facilitated customer-facing performance areas while increasing short and medium-term operational expenditures. This indicates most retail SMEs are unable recovering digital investment costs through value timeously realized. Policymaker and manager near-term focus should instead be on service delivery improvement and new revenue generation, while postponing later cost savings expectations most likely occurring after investment recovery, technology complete assimilation, and efficient operational routine establishment.

Our findings about retail SMEs still undergoing digital transformation point to new technologies requiring relevant organizational structure reconfigurations and capabilities management systems ensuring success. This reinforces organizational capabilities dominance as success determinants during turbulent change periods over financial resources. This emphasizes to practitioners that digital transformation as state changes needs achieving through supporting system nexuses comprising appropriate technology, employee skill and training levels, finance, regulatory environment, reasonable time expectations, and transformation results.

Retail industry keeps advancing towards more holistic online and offline business models. Businesses which develop digital business competencies despite continual high implementation costs, decreasing store traffic, and increasing competition challenges position themselves favorably. Evidence indicates, on the basis of order and capability, purposeful digital

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transformation enhances organizational resilience, engagement, and competitive advantage in the soft market context of the organization.

Future successful sellers supporting an omnichannel approach will secure expanded market accessibility, improved customer gratification, and improved market adaptability to future unpredictability. The ongoing transformation of the SMEs will require sustained investment from their managers, full infrastructure support from the shopping center operators, and clear minimal loss policies from the government that will enhance the market for digital retail ecosystems. A digitally transformed retail sector is crucial for the developing economies to thrive.

FUNDING STATEMENT

This study received no specific financial support.

INSTITUTIONAL REVIEW BOARD STATEMENT

This study involving human participants was reviewed and approved by the University of Santo Tomas Graduate School Research Ethics Committee (REC Code: GS2023-057, approved November 2023). The study protocol adhered to the ethical principles outlined in the Declaration of Helsinki and Philippine national research ethics guidelines. All participants provided written informed consent prior to data collection, and confidentiality safeguards were implemented throughout the research process.

TRANSPARENCY STATEMENT

The manuscript depicts the authors' study in an honest and transparent manner possible. We have not left out any important feature of the study and justified all differences between the study and the initial research plan. The authors have not hidden any detail of the study, the design of the study, methods of data collection, methods of data analysis, and the results of the study. All authors have reviewed and approved the final manuscript and accept responsibility for its content.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical approval and participant confidentiality requirements.

AUTHORS' CONTRIBUTIONS

Eriland Ruiz B. Osio conceptualized the research study, designed the research methodology, developed the survey instrument, coordinated data collection activities, , interpreted the results, and wrote the manuscript draft. Fernando L. Trinidad supervised the research project, provided critical guidance on theoretical framework development, reviewed the analytical approach, and contributed to results interpretation. Grecebio Jonathan D. Alejandro assisted with research design refinement, contributed to acquisition and synthesis of literature review, validated the statistical interpretation, and critically revised the manuscript. All authors collaboratively developed the research hypotheses, reviewed multiple manuscript drafts, and approved the final version.

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